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A cross-sectional survey of eating behaviors and psychological factors among young people some psychological factors and eating behaviors

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ABSTRACT

Aims: Understanding the cognitive, behavioral, and psychological issues associated with eating provides important insight into the development of diseases such as obesity and anorexia, and possibly ways to prevent or treat their occurrence. This study aims to examine the associations between cognitive, behavioral, and emotional aspects of eating habits and psychological factors such as depression, anxiety, and stress among young people.

Methods: The study was conducted with 390 university students, 43.3% male and 56.7% female. The data of the study were gathered via a survey form. The survey form includes a personal information form, the Three Factors Eating Questionnaire (TFEQ-R21) and the Depression, Anxiety and Stress Scale (DASS-21).

Results: It was determined that individuals with depression, anxiety and stress had higher uncontrolled eating, cognitive restraint and emotional eating scores than healthy individuals ($p<0.05$). Emotional eating scores of women were greater than those of men ($r= 0.141$; $p=0.001$). A 1-point increase in stress score was associated with 0.330 and 0.207 point increases in uncontrolled eating and cognitive restraint scores, respectively ($p<0.001$). A 1- point increase in depression score increases the emotional eating score by 0.261 points ($p<0.001$).

Conclusion: Depression, anxiety, and stress were significantly linked to disordered eating behaviors, highlighting the need for integrated mental health and nutritional interventions. In future studies, evaluating the effects of these psychological factors on food and nutrient intakes may contribute to the determination of the nutritional status of young adults.

Keywords: Anxiety, cognitive restraint, emotional eating, depression, uncontrolled eating, stress

INTRODUCTION

Eating behavior is a term used in relation to eating habits, food selection, food preparation and food consumption.[1] Gaining appropriate eating behavior is very crucial for maintaining a healthy life.[2] However, lifestyle transitions during young adulthood especially university students, such as leaving home to live independently, studying, social networks, first job, marriage, etc., can contribute to the disruption of eating behaviors.[3] Disruption of eating behaviors also leads to obesity, diabetes, cancer, cardiovascular diseases and numerous other health problems.[4,5] In terms of eating behaviors, 3 types of eating behaviors are generally emphasized.[2] These are cognitive restrained, emotional eating, and uncontrolled eating.[2] Uncontrolled eating behavior is the tendency to lose control over food when the individual feels hungry or when external factors (e.g. very tasty food) are present. It can occur even in the lack of physiological hunger. Cognitive restraint refers to the intentional restriction of food intake in order to control body shape and weight. Finally, emotional eating is overeating behavior that occurs in negative emotional states (anger, sadness, stress, etc.).[6]

Eating behavior is influenced by many factors such as genetics, environment, past experiences, cultural characteristics, media, body perception and psychiatric conditions.[4,7] Psychiatric conditions such as stress, depressive symptoms and anxiety can lead to alter eating behavior.[8] It is known that stress can alter food intake and eating behaviors in children, adolescents and adults.[9] The increase in glucocorticoids caused by acute stress may decrease hypothalamic-pituitary axis activity and nutrition, whereas in chronic stress high glucocorticoids may increase food intake through stimulatory effects.[8,10] Increased depressive and anxiety symptoms have been associated with increased food intake, excessive consumption of foods such as carbohydrates, sugar and fast food, negative emotional eating and impaired eating behaviors.[11,12] This study aimed to evaluate the relationship between depression, anxiety and stress and restrained eating, emotional eating, and external eating in university students.

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METHODS

Ethics

Before the study was conducted, written permission was obtained from Malatya Turgut Özal University Non-Interventional Research Ethics Committee (Decision No: 2022/112). After the participants were informed about the voluntary answers, the purpose of the study and how the results of the study would be used, their consent (informed consent principle) was obtained verbally and in writing. The students participating in the study were informed that information about themselves would not be disclosed to anyone else and the "principle of confidentiality" was complied with. The research was conducted following the principles of the Declaration of Helsinki.

Design

The current study is descriptive and cross-sectional.

Population and Sample of the Study

The data were gathered at a state university in Turkey between March 2024 and April 2024. The population of the study consisted of 3453 undergraduate students registered at Malatya Turgut Özal University between the dates of the study.The sample of the study was determined by power analysis. The sample size of the study was calculated using the mean, standard deviation, correlation (r) and coefficients of determination (R2) obtained from a pilot study with 30 participants. According to the calculation made by using the G*power 3.1 program, the sample size was determined to be at least 368 with an effect size of 0.40, a margin of error of 0.05, a confidence level of 0.95.

Inclusion or exclusion criteria:

Study inclusion criteria:

- Volunteering to participate in the study,
- 18 years of age or older,

Study exclusion criteria:

- Pregnant and lactating women,
- Individuals with any severe psychological disorder and who are taking medication for this reason,
- Individuals with eating disorders and chronic diseases that require special diets
- Individuals who did not fill out the questionnaire reliably by the researcher,
- Individuals who left the questionnaire form without completing it despite volunteering were excluded from the study.

Scales

The study data were collected using a personal information form, the three factor eating questionnaire (TFEQ-R21) and the depression, anxiety and stress scale (DASS-21).

1. Personal Information Form: The survey data were collected by the researchers through face-to-face interviews. In addition, the questionnaire was administered to the participants during class hours with permission. The data collection form was explained to the students by the researcher and the answers were recorded on the form. The personel information form includes descriptive information on age, gender, anthropometric measurements and financial status of the participants.

Anthropometric Measurements

Body weight and height: The body weight and height of individuals will be collected according to the participant's declaration.

Body mass index (BMI): It will be calculated in kg/m^2 with the formula body weight / height (m^2).

2. Three Factors Eating Questionnaire (TFEQ-R21): It was first developed by Stunkard and Messick[13] in 1985 to measure behavioral and cognitive aspects of eating. The questionnaire originally included 51 items, however, it was reduced to 18 items by Karlsson et al.[14] (2000) due to its limited feasibility. The 21-item questionnaire form was revised and adapted to Turkish culture by Karakuş et al.[6] in 2016. All of the items in the scale are on a 4-point Likert scale and the response is scored as "absolutely wrong" 1, "mostly wrong" 2, "absolutely right" 3 and "mostly right" 4. The questionnaire shows a 3-factor structure among its components. Uncontrolled eating (UE) consist of 9 items (items 3, 6, 8, 9, 12, 13, 15, 19 and 20). The minimum score for sub-factor is 9 and the maximum score is 36 points. Cognitive restraint (CR) consist of 6 items (items 1, 5, 11, 17, 18 and 21). The minimum score for this sub-factor is 6 and the maximum score is 24 points. Emotional eating (EE) consist of 6 items (items 2, 4, 7, 10, 14 and 16). The minimum score for this sub-factor is 6 and the maximum score is 24 points. A higher score in any sub-factor in the questionnaire indicates that the eating behavior related to that factor is more predominant.

3. The Depression, Anxiety and Stress Scale (DASS-21): The Depression Anxiety Stress Scale (DASS) was first designed by Lovibond and Lovibond[15] (1995) consisting of 42 items. The adaptation of the 21-question DASS which was used in the scope of the study was made by Henry and Crawford[16] (2005) and it was revealed that the short form could be used. The scale was translated into Turkish by Yılmaz et al.[17] (2017). This scale (DASS-21) includes seven items each to evaluate the levels of depression, anxiety and stress. The first seven items in the scale are related to anxiety, seven items between eight-fourteen are related to depression and seven items between fifteen-twenty one are related to stress. In the scoring of the scale, the high scores are taken into consideration. Higher or lower scores for depression, anxiety and stress indicate that the participants experience these conditions at a higher or lower rate (Table 1). Participants who scored between zero-nine points, zero-seven points and zero-fourteen points on depression, anxiety and stress subscales, respectively, were defined as healthy.

Statistical Analysis

In the evaluation of the findings obtained in the study, IBM SPSS Statistics 25 (IBM SPSS, Turkey) program was used for statistical analysis. Descriptive statistics such as mean, standard deviation, minimum, maximum values, numbers and percentages were used to summarize the data.

In our study, it was determined whether the groups were normally distributed. Skewness and Kurtosis values were examined for the normality test. Skewness and Kurtosis[18]

values should be in the range of ±3 in order to understand that the data conform to normal distribution. Skewness and Kurtosis values were found to be between 0.817/-0.302 for the DASS-21 scale and 0.384/-1.863 for the three-factor eating questionnaire. It was determined that all scales and subscales showed normal distribution since the Skewness and Kurtosis values obtained from the scales and subscales were within the range of ±3. The difference between two independent groups was tested with the independent samples t-test. Multiple Linear Regression analysis with the backward selection method was performed for the effect of related variables on uncontrolled eating, cognitive restraint, and emotional eating scores, and standardized and unstandardized regression coefficients and VIF values for multicollinearity were obtained. P-value <0.05 was considered statistically significant.

RESULTS

The sociodemographic characteristics of the participants are given in Table 1. Initially, 428 university students were recruited between the specified dates. Since thirty-eight students did not participate in the study and did not fill out the questionnaire questions reliably, the study was completed with 390 students (91% completion rate). 43.3% of the participants were male and 56.7% were female. The mean age of the study participants was 20.58±2.22 years. The mean body weight, height and BMI of the participants were 65.08±13.21 kg, 170.53±9.15 cm and 22.23±3.25 kg/m^2, respectively. More than half of the participants (64.9%) were in the first grade. Those who answered "my income is less than my expenses" were found to be 59.5%. The mean depression, stress and anxiety scores of the participants were 13.08±5.06, 13.72±5.29 and 13.65±4.92 points, respectively. In the study, it was determined that the mean uncontrolled eating score of the participants was 17.51±6.29 points; the mean cognitive restraint score was 11.59±4.82 points and the mean emotional eating score was 10.74±4.65 points.

The distribution of uncontrolled eating, cognitive restraint and emotional eating scores of the participants in terms of depression, anxiety and stress are given in Table 3. According to DASS-21, 69.5% of the participants have depression, 86.9% have anxiety and 38.7% have stress. Uncontrolled eating, cognitive restraint and emotional eating scores of individuals with depression were higher than those of individuals without depression (p<0.001). Considering eating behaviors according to anxiety status, it was determined that all eating behavior scores of individuals with anxiety were higher and the difference was found to be statistically significant (p<0.05). Similar to depression and anxiety status, uncontrolled eating, cognitive restraint and emotional eating scores of stressed individuals were found to be higher than non-stressed individuals and the difference was statistically significant (p<0.001).

The correlations between the sociodemographic features and depression, anxiety and stress scores of the individuals who participated in the study and the scores of uncontrolled eating, cognitive restraint and emotional eating are also given in Table 3. Emotional eating scores of women were greater than those of men (r=0.165; p=0.001). Statistically significant correlations were found between body weight and uncontrolled eating (r=0.149), cognitive restraint (r=0.200) and emotional eating (r=0.112) (p<0.001). Statistically significant positive correlations were found between depression, anxiety and stress scores and uncontrolled eating, cognitive restraint and emotional eating scores (p<0.001).

The results of the regression analysis of the variables are given in Table 3. When the results were evaluated; BMI (B=0.696; t=4.195; p<0.001) and stress (B=0.330; t=2.919; p=0.004) scores were found to be effective on uncontrolled eating; 1 unit increase in BMI score increases the uncontrolled eating score by 0.696 points and 1 point increase in stress score

Table 1. Sociodemographic characteristics of the participants

Variables		X±SD or n (%)
Age (year)		20.58±2.22
Gender	Male	169 (43.3)
	Female	221 (56.7)
Body weight (kg)		65.08±13.21
Height (cm)		170.53±9.15
BMI (kg/m^2)		22.23±3.25
Marital status	Single	380 (97.4)
	Married	10 (2.6)
Faculty/vocational school	Health science	133 (34.1)
	Medicine	10 (2.6)
	Vocational school of health	91 (23.3)
	Agriculture	21 (5.4)
	Engineering	133 (34.1)
	Other	2 (0.5)
Grade	1. grade	253 (64.9)
	2. grade	132 (33.8)
	3. grade	4 (1.0)
	4. grade	1 (0.3)
Income	My income is less than my expenses	232 (59.5)
	My income is equal to my expense	122 (31.3)
	My income is more than my expenses	36 (9.2)
DASS-21 scale subcategories		
Depression		13.08±5.06
Anxiety		13.72±5.29
Stress		13.65±4.92
TFEQ-21 scale subcategories		
Uncontrolled eating		17.51±6.29
Cognitive restraint		11.59±4.82
Emotional eating		10.74±4.65

Variables are expressed as number (%). mean±standard deviation. BMI: Body mass index DASS-21: Depression. Anxiety and Stress-21. TFEQ-21: Three Factor Eating Questionnaire-21.

Table 2. The correlations between the sociodemographic features, depression, anxiety and stress scores and uncontrolled eating, cognitive restraint and emotional eating.

	Uncontrolled eating		Cognitive restraint		Emotional eating	
	r	p	r	p	r	p
Gender*	0.029	0.495	0.056	0.190	0.165	**0.001**
Age*	-0.043	0.396	-0.009	0.863	-0.073	0.152
Body weight*	0.149	**0.003**	0.200	**0.000**	0.112	**0.027**
BMI*	0.247	**0.000**	0.303	**0.000**	0.273	**0.000**
Income**	-0.040	0.329	-0.012	0.778	-0.039	0.360
Depression*	0.377	**0.000**	0.242	**0.000**	0.329	**0.000**
Anxiety*	0.381	**0.000**	0.205	**0.000**	0.310	**0.000**
Stress*	0.400	**0.000**	0.245	**0.000**	0.311	**0.000**

*The Pearson correlation coefficient, ** Kendall's τ coefficient, BMI: Body mass index

increases the uncontrolled eating score by 0.330 units. BMI is more effective than stress on uncontrolled eating. Gender (B=1.528; t=3.187; p=0.002), BMI (B=0.510; t=7.050; p<0.001) and stress (B=0.207; t=4.489; p<0.001) scores were found to be effective on cognitive restraint; cognitive restraint score of women was higher, 1 unit increase in BMI score increased cognitive restraint score by 0.510 points, 1 point increase in stress score increased cognitive restraint score by 0.207 points. BMI is more effective on cognitive restraint than stress and gender. BMI (B=0.709; t=4.725; p<0.001) and depression (B=0.261; t=6.233; p<0.001) scores were found to be effective on emotional eating; 1 unit increase in BMI score increases the emotional eating score by 0.709 points and 1 unit increase in depression score increases the emotional eating score by 0.261 points. BMI is more effective on emotional eating than depression.

DISCUSSION

In our study, uncontrolled eating, cognitive restraint and emotional eating scores of individuals with depression were found to be higher than those of individuals with no depression (Figure 1). Moreover, statistically significant correlations were found between depression and uncontrolled eating, cognitive restraint and emotional eating scores (Table 2). The findings of the studies carried out on this issue are similar to the findings of our study.[19,20] Depression is one of the important factors affecting eating behaviors. Individuals with symptoms of depression may increase or decrease their food intake.[21] High intensity negative emotions suppress food intake due to their association with physiological responses that reduce appetite.[22] However, negative emotions with less intensity can increase or decrease food intake according to individuals' characteristics and situations.[23] Individuals may engage in emotional eating to cope with stress and negatif emotions such as depression. It has been reported that individuals with emotional eating behavior increase their food intake and prefer unhealthy foods.[21]

In our study, cognitive restraint, uncontrolled eating and emotional eating scores were found to be higher in individuals with stress and anxiety compared to individuals without stress and anxiety (Figure 1). In addition, statistically significant positive correlations were determined between anxiety and stress scores and cognitive restraint, uncontrolled eating and emotional eating scores (Table 2). Studies have found that there is a relationship between stress and anxiety and restrained, emotional, and external eating and disordered eating behaviors.[24,25] Induviduals may engage in eating behaviors such as emotional and external eating to cope with negative emotions including anxiety and stress.[26,27] In a study conducted by Groesz,[28] high stress levels were found to decrease eating control, induce hunger, and increase restrained and binge eating behaviors.

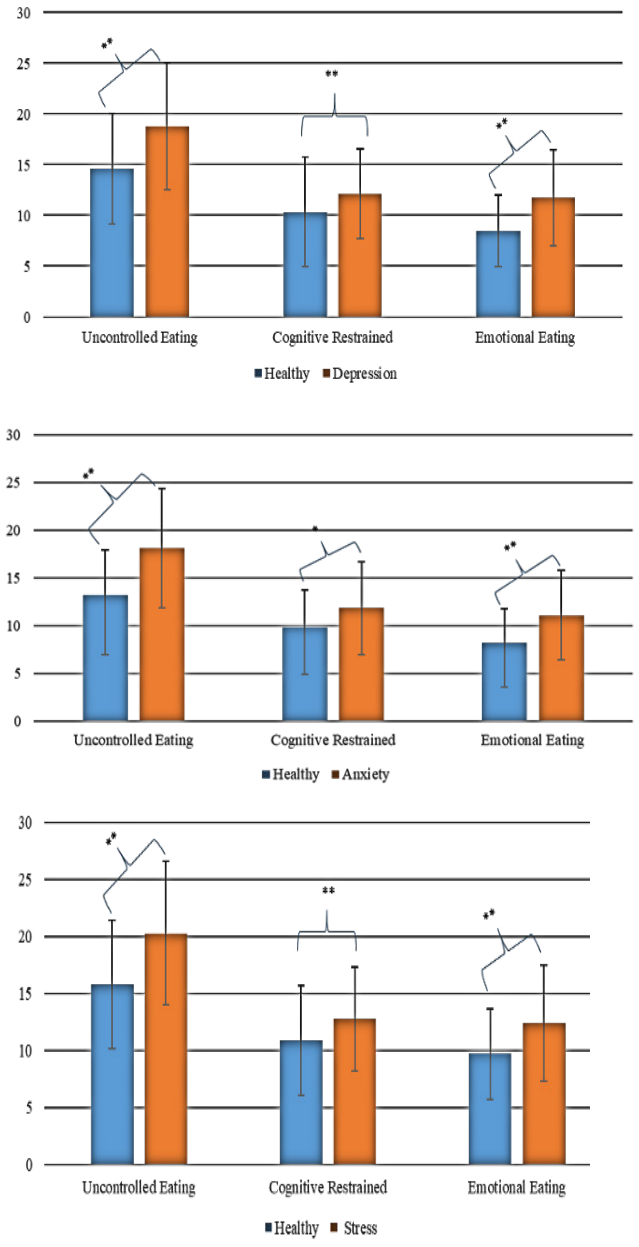
The relationship between gender and eating behaviors is widely known. In our study, emotional eating scores were found to be higher in women than in men (Table 2). Moreover, the cognitive restraint score of women was 1.528 points greater than that of men (Table 3). In a study conducted by Zakhour et al.[29] it was reported that restrictive eating scores were higher in women than in men. However, no significant difference was found in emotional eating scores compared to gender. In other studies, it was shown that emotional and restrictive eating scores were higher in women than in men.[30,31] In our study, it is thought that the reason for the difference in terms of emotional eating is that the way of coping with problems can vary according to gender. The reason why the cognitive restraint score is higher in women is that women tend to have a perfect body more than men. Moreover, women are more likely to engage in food-restricting behavior because they are more likely to consume foods with high energy content compared to men.[32]

Body weight has a critical importance on individuals' eating behaviors. In our study, statistically significant positive correlations were observed between uncontrolled eating, cognitive restraint and emotional eating scores and BMI and body weight (Table 2). Furthermore, a 1-unit increase in BMI was associated with 0.696, 0.510 and 0.709 unit increases in uncontrolled eating, cognitive restraint and emotional eating scores, respectively (Table 3). In a study conducted with adolescents, the cognitive restraint subscale scores of the three-factor eating scale were divided into quartiles from small to large. When the 1st quartile was compared with the 4th quartile, it was found that the participants in the 4th quartile

Table 3. The results of the regression analysis of the variables

	Uncontrolled eating					Cognitive restraint					Emotional eating				
	B	**Beta**	**t**	**p**	**VIF**	**B**	**Beta**	**t**	**p**	**VIF**	**B**	**Beta**	**t**	**p**	**VIF**
Constant	-0.429		-0.202	0.840		-4.969		-2.475	**0.014**		-1.656		-0.595	0.552	
Age	-0.166	-0.059	-1.301	0.194	1.012	-0.038	-0.017	-0.369	0.712	1.026	-0.176	-0.084	-1.863	0.063	1.022
Gender	-0.286	-0.023	-0.314	0.754	2.564	1.528	0.157	3.187	**0.002**	1.130	1.204	0.128	1.795	0.073	2.561
Body weight	-0.068	-0.144	-1.672	0.095	3.678	0.030	0.081	0.611	0.542	8.210	-0.077	-0.220	-1.707	0.089	8.284
BMI	0.696	0.360	4.195	**<0.001**	3.671	0.510	0.344	7.050	**<0.001**	1.108	0.709	0.496	4.725	**<0.001**	5.511
Income	-0.127	-0.013	-0.295	0.768	1.018	0.083	0.011	0.242	0.809	1.019	0.044	0.006	0.137	0.891	1.019
Depression	0.040	0.032	0.302	0.763	5.717	0.087	0.091	0.959	0.338	4.203	0.261	0.284	6.233	**<0.001**	1.036
Anxiety	0.176	0.148	1.667	0.096	3.904	-0.093	-0.102	-0.954	0.341	5.302	0.083	0.094	1.000	0.318	4.438
Stress	0.330	0.258	2.919	**0.004**	3.895	0.207	0.211	4.489	**<0.001**	1.028	0.060	0.064	0.635	0.526	5.027
	R^2=0.227; F(p) = 28.264 (**<0.001**)					R^2=0.169; F(p) = 26.204 (**<0.001**)					R^2=0.232; F(p) = 23.152 (**<0.001**)				

Multiple Linear Regression Analysis, BMI: Body-mass index



*p<0,005, **p<0,001

Figure 1. The distribution of uncontrolled eating, cognitive restraint and emotional eating scores of the participants in terms of depression, anxiety and stress

had higher BMI, waist circumference, fat mass and obesity degree than the participants in the 1st quartile.[33] In a study conducted with university students, positive correlations were observed between body weight and waist circumference and uncontrolled eating, cognitive restraint and emotional eating scores.[34] Moreover it was reported that as the uncontrolled eating score of individuals increased, their energy intake also elevated and dietary disinhibition and cognitive restraint behaviors increased the risk of being overweight/obese by 14.2% and 7.6%, respectively.[35]

Limitations

First, the results gathered from this study are limited to university students who received education in a single center over a specific period of time. Second since the data of the study were collected through a questionnaire form, there is a possibility of bias in participants' responses. Third, the cross-sectional nature of the study does not clearly demonstrate the reason for the relationship between depression, anxiety, stress and some sociodemographic features of participants and cognitive restraint, emotional eating and uncontrolled eating behaviors.

CONCLUSION

Psychological factors have an impact on food intake, nutritional status and eating behaviors.[36] University students are prone to impaired eating behaviors due to psychological alterations caused by lifestyle changes.[37] In our study, it was found that depression, anxiety and stress may have an effect on eating behaviors in university students. It was also found that body weight gain can be associated with cognitive restraint, emotional eating and uncontrolled eating behaviors. The acquisition of healthy eating habits instead of impaired eating behaviors can only be possible by improving the psychological factors underlying impaired eating behaviors. For this reason, dieticians and psychiatrists should collaborate to promote healthy eating habits.

In our study, only the effects of depression, anxiety and stress on uncontrolled eating, cognitive restraint and emotional eating were evaluated. In future studies, evaluating the effects

of these psychological factors on food and nutrient intakes may contribute to the determination of the nutritional status of young adults. In addition, larger sample size studies can be more decisive in evaluating the effects of these psychological factors on uncontrolled eating, cognitive restraint, emotional eating and other eating behaviors.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was conducted, written permission was obtained from Malatya Turgut Özal University Non-interventional Researches Ethics Committee (Decision No: 2022/112).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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